

**Before the
Federal Communications Commission
Washington, D.C. 20554**

In the Matter of)	
)	
Petition for Rulemaking to Adopt AeroMACS)	RM-11793
Service Rules)	
)	
To: Wireless Telecommunications Bureau		

**STATEMENT OF POSITION ON
PETITION FOR RULEMAKING**

Aerospace and Flight Test Radio Coordinating Council, Inc. (“AFTRCC”) hereby submits a Statement of Position on the Petition for Rulemaking to Adopt AeroMACS Service Rules filed by The WiMax Forum (“the “Forum”).¹ As explained below, AFTRCC has serious concerns regarding the proposed rules; more work is needed before the Commission can make an informed decision whether to proceed to adoption of a notice of proposed rulemaking.

Introduction

AFTRCC is an association of the nation's principal aerospace manufacturers (see Attachment). AFTRCC was founded in 1954 to serve as an advocate for the aerospace industry on matters affecting spectrum policy, and it serves as the recognized non-Government coordinator for the shared Government/Non-Government spectrum allocated for flight testing. AFTRCC is also the FCC-designated aeronautical mobile telemetry (“AMT”) coordinator for secondary medical body area network use of the flight test spectrum at 2360-2390 MHz, and is responsible for coordination with Wireless Communications Services licensees in the 2345-2360

¹ The Comments are submitted in response to Public Notice, “Wireless Telecommunications Bureau Seeks Comment on WiMax Forum Petition Proposing Rules for the Aeronautical Mobile Airport Communications System, DA 17-696, July 19, 2017.

MHz band. Most recently, AFTRCC was designated by the Commission to coordinate wireless microphone use on a secondary, licensed basis in the 1435-1525 MHz AMT band. AFTRCC works closely with Federal Area Frequency Coordinators, who are responsible for Federal Government use of the spectrum, in an effort to ensure that interference-free flight test operations are protected, and flight safety is maximized.

Background

As the Commission's records reflect, the AMT community has long sought access to additional spectrum resources to supplement the safety-of-life spectrum at 1435-1525 and 2360-2390 MHz. It was for this reason, among others, that the United States championed identification of the 5091-5150 MHz band for AMT at the 2007 World Radiocommunication Conference.² The need stems from the loss of legacy spectrum such as 2310-2360 MHz, combined with exponential growth in the amount of data required for flight testing modern aircraft -- from a few hundred data points for the Boeing 707, for example, to more than 100,000 for the 787. These test data are essential, in the case of the production of commercial aircraft for FAA airworthiness certification, and, in the case of military aircraft for certification that the aircraft or missile performs in accordance with contract specifications.

Over the last 30 years, the number of measurements collected during flight testing have steadily increased. In the early days, aircraft used mechanical control rods to translate inputs from the pilot to the control surfaces. As aircraft evolved, control rods were supplemented with hydraulic lines and later replaced by sensors and actuators connected by wire (*i.e.*, fly-by-wire).

² See *In the Matter of Amendment of Parts 1, 2, 15, 25, 27, 74, 78, 80, 87, 90, 97, and 101 of the Commission's Rules Regarding Implementation of the Final Acts of the World Radiocommunication Conference (Geneva, 2007) (WRC-07), Other Allocation Issues, and Related Rule Updates*, FCC 15-50, 30 FCC Rcd 4183 (2015)(hereinafter, "Report and Order") at para. 53.

In addition, as the number and complexity of critical flight systems have increased, the number and complexity of redundant or back-up systems have increased as well. When coupled with advances in aerodynamics, fuels, and other technologies, it creates ever more challenging test environments. Tests in these environments require much greater quantities of measurement data transmitted to ground engineers in real-time, not only to determine whether the system performs as designed, but to decide in real-time whether to continue or abort a test flight.

For instance, digital video cameras now represent an increasingly important source of data for both manned and unmanned (e.g. missiles) test flights. Cameras complement traditional sensors, offering "pictures" that other sensors cannot capture. Video can be synchronized with other instrumentation to record the movements of "tufts," or "strings" glued to the aircraft skin, visibly indicating the direction of air flow over the surface of the aircraft at every instant during flight maneuvers, thereby providing insight for design changes to increase performance and efficiency. Video also provides other benefits, such as the ability to closely observe the interaction of water and tires during wet runway testing, monitoring ice build-up on control surfaces during icing tests, and determining the time lag on cockpit avionics displays.

Video is also used for monitoring weapons separation tests and scoring, and for an over-the-shoulder view of the instrument panel as seen by the pilot. The latter is utilized when trying to capture pilot workload: High definition video can show flight test engineers on the ground what the pilot sees, and how he or she is reacting to the various gauges, warning lights, and other visual and auditory inputs. These video inputs are merged with the rest of the flight test telemetry stream, improving the efficiency and efficacy of the ground operations, but also adding significantly to the spectrum requirement.

Not only has the number of measurements vastly increased, but they are taken with much greater frequency and precision. With these combined demands, telemetry data rates have increased significantly, which requires more radio frequency spectrum. In general, the amount of instantaneous data collected today requires a much higher data rate than in years past. Indeed, certification of next generation commercial aircraft could require data rates in the 100 to 200 Mbps range.

The 5091-5150 MHz allocation is critical to helping the industry mitigate the spectrum constraint -- but if the AMT community cannot secure access to this band at the small number of airports which happen to be close to major aerospace manufacturing plants, the benefits of this AMT allocation will be severely compromised. And at present, that access is in doubt.

Discussion

One of the issues referenced in the Petition is the coordination of frequency usage between and among Federal and non-Federal AeroMACS users, and Federal and non-Federal AMT users. As proposed by the Forum, the AeroMACS part of this responsibility would be fulfilled by a single Channel Manager designated by the Commission. However, the Petition does not identify how the sixteen 5 megahertz channels available in the 5000-5030 and 5091-5150 MHz bands would be coordinated between and among various users, either generally or at specific airports. As the Petition explains it,

“The Channel Manager will process requests by non-Federal users for access to AeroMACS channels, assign channels to non-Federal users in a fair and equitable manner to ensure efficient use of AeroMACS spectrum and to prevent either hoarding or warehousing of spectrum by any one entity, and coordinate with other authorized users of the AeroMACS frequencies, including Federal AeroMACS users and AMT users of the 5091-5150 MHz band.”⁵⁰

⁵⁰ The Channel Manager will have discretion to assign a given channel to a non-Federal licensee for use either across the entire airport property or only at specific locations on the airport property, or on a time-sharing basis, in order to facilitate sharing and for efficient utilization of spectrum.

It is not by accident that the rules proposed in Appendix A for the Channel Manager do not specify how the Channel Manager is to assign channels to eligible users, whether any types of entities should be granted priority or preference in channel assignments, whether channels can be shared by different entities, the duration of channel assignments, build-out requirements, or the like. This was done intentionally to provide the Channel Manager flexibility to manage the AeroMACS spectrum so as to maximize efficient usage. . . . *At this nascent stage of AeroMACS evolution before service applications have been fully developed, it would not be prudent to adopt overly specific and prescriptive rules. It is not yet clear how AeroMACS usage by Federal and non-Federal entities will unfold over time, how much spectrum various AeroMACS applications will require, and who will be the primary users. Rather than trying to predict these factors without sufficient real-world experience, the Commission should adopt rules that allow the Channel Manager to react flexibly to marketplace and technological developments.*

Petition, at pages 16 and 22 (emphasis added).

AFTRCC appreciates the Forum's concern about the lack of clarity regarding AeroMACS usage. But that said, the inchoate nature of the proposed channel assignment process -- especially the absence of any criteria for coordinating and assigning channels for AMT use -- is of serious concern for AFTRCC and its Member Companies. In several instances identified by AFTRCC's members, major aircraft (including missile) manufacturing plants are co-located with, or in proximity to, airports where AeroMACS would be deployed. The Commission issued an initial recognition of this in the *Report and Order* where six specific airports were identified by name as having a requirement for AMT in the 5091-5150 MHz band.³ The Commission went on to acknowledge the need for additional airports to be considered on a "case-by-case basis."⁴ Furthermore, while airport surface wireless systems operating in the AM(R)S, i.e. AeroMACS, will have priority over AMT systems in the 5091-5150 MHz band, the Commission "urged operators of AM(R)S and AMT systems at the six requested airports to

³ *Report and Order* at para. 60.

⁴ *Id.*

cooperate with each other and exchange information about planned deployments of their respective systems,” noting that “[s]uch cooperation will enhance the prospects for compatible sharing of the band.”⁵

To this end, AFTRCC has prepared analyses of potential compatibility assessments, and has sought cooperation to validate techniques for compatible co-existence, such as field tests. It has noted, among other things, that Airbus has conducted tests of AMT-AeroMACS compatibility at Toulouse, France where the Airbus plant is located, and that those tests produced encouraging results.⁶ Working with AeroMACS operators here, AFTRCC is prepared to demonstrate the efficacy of those, and possibly other, techniques in a U.S. deployment with actual AeroMACS and AMT systems. Unfortunately, efforts to secure agreement with the FAA to a course of action have been thus far unsuccessful.⁷

The results of the proposed tests will provide critical information for the criteria by which a channel manager (or managers) can coordinate and assign channels -- not just for AeroMACS but also for AMT. Those criteria would help fill in what is currently a serious gap in the proposed AeroMACS regulatory regime.⁸

⁵ *Id.*

⁶ AeroMACS Final Verification Report, prepared by the SESAR Consortium in 2015. https://www.sesarju.eu/sites/default/files/solutions/03_VR_Solution_102_9.16-D11-AeroMACS_Final_Verification_Report.pdf. It is also AFTRCC’s understanding that an AMT-AeroMACS test was recently conducted by Embraer, with likewise encouraging results.

⁷ Another point where informal discussion among the interested parties would be in order relates to the role of the Channel Manager in respect of NTIA and its (NTIA’s) role for this shared, Federal/non-Federal band. The Petition contemplates a memorandum of agreement being entered into by the Channel Manager and NTIA. *Id.* at page 15. Such an agreement might be important to efficient coordination and use of these shared channels. Here again, informal discussion before proceeding to a notice of proposed rulemaking, rather than trying to resolve issues via pleadings in the course of a rulemaking, would be the best approach.

⁸ While other issues could be raised by AFTRCC regarding proposals in the Petition, the one addressed here is of overarching importance to the aerospace industry.

Conclusion

After all these years, denial of access to the band for flight testing would be a grave disservice to the nation's air transportation system and to the flying public -- which depend on new and improved aircraft; to the aerospace industry -- which remains the nation's single most important contributor to a net positive balance of trade; to thousands of aerospace employees; and to national security -- which is strengthened by the military aircraft manufactured by these employees.

Accordingly, for all these reasons, it is premature for the Commission to proceed to a notice of proposed rulemaking.

Respectfully submitted,

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